Pre-Analysis Plan:
Tax Compliance Among Small Firms in Rwanda

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Abstract

How do small firms navigate tax compliance in low enforcement environments? Using the population of administrative tax declarations by Rwandan firms from 2008 to 2016 to evaluate a 2012 reform in Rwanda that introduced an income tax exemption threshold, we find that firms previously below the exemption threshold on average double the amount of taxable income reported to the tax authority and increase the amount of tax paid by 60 percent in the post-reform period. Potential mechanisms behind this response include overestimation of the likelihood of experiencing an audit, the influence of peers on the declaration decision, and changes in the actual likelihood of experiencing enforcement resulting from the choices of local peers. In order to identify which of these mechanisms explain the observed behavior, we will conduct a survey of 1,000 taxpayers to collect detailed information on the tax compliance decisions of small firms and assess their responses to information through an experimental approach. The survey will measure how the characteristics of firms differ across amounts of reported taxable income in order to understand the responses observed in the quasi-experimental analysis. The survey will contain an information experiment, the design of which is detailed in this pre-analysis plan. The experiment addresses the potential mechanisms by assessing how taxpayers respond to information about (1) the likelihood of experiencing an audit or review from the tax authority and (2) the declaration choices of local peers. Outcomes will be assessed through a survey experiment approach and by observing the actual post-treatment tax declarations made by firms in the sample.

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1   Introduction and Context

To generate revenue from taxpayers with substantial opportunities to evade liabilities, developing country governments with low tax enforcement capacity must often rely on approaches that differ greatly from those traditionally applied in developed settings. These strategies can take the form of removing bureaucratic barriers to formal sector participation, adopting tax-withholding structures by which liabilities are closely tracked or automatically remitted, and enhancing the strengh of audits and punishments. A growing body of literature examines the impact of these strategies and documents the sensitivity of tax compliance to degrees and methods of oversight and enforcement (Galiani, Melendez, and Ahumada, 2017; Brockmeyer and Hernandez, 2017; Carrillo, Pomeranz, and Singhal, 2017; Pomeranz, 2015; Best, Brockmeyer, Kleven, Spinnewijn, and Waseem, 2015). However, much of this new empirical evidence is concentrated in lower to upper middle income economies, whereas in the poorest countries governments may encounter greater obstacles to growing tax bases. Extremely limited enforcement capacity and limited benefits to formal status constrain the capacity of these governments to generate widespread compliance, contributing to high levels of informality. In Sub-Saharan Africa, the informal economy accounts for between 20 and 65% of GDP (Medina, Jonelis, and Cangul, 2017). Crafting optimal tax systems, and selecting among a diverse menu of tax instruments and enforcement options, presents a substantial challenge to governments for whom generating revenues to fund the process of development is a pressing concern.

Increasingly, policymakers in low income countries have turned to simplified forms of taxation to build their tax bases by reducing the barriers to voluntary compliance among small and micro enterprises. Such simplication includes taxing turnover rather than profits, levying low rates, making payments lump sum. Turnover taxation of firms, by which annual income or revenues are taxed rather than revenue minus costs, reduces compliance requirements: firms need only track a limited number of production measures, often taxed according to uncomplicated schedules with marginal tax rates that are substantially lower than those applied to profit taxation[1]. The obstensible policy objective of this approach is to encourage micro, small, and medium-sized firms to voluntarily declare and pay income tax in environments where these firms would be otherwise unlikely to participate

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[1]In Rwanda, since 2012, the turnover rate is 3% of business income, while the profit tax rate is 30%. The turnover tax rate in Pakistan in 2015 was only 0.5%, whereas the profit tax rate was 35% (Best, Brockmeyer, Kleven, Spinnewijn, and Waseem, 2015).

in the prevailing profit tax regime. Where only profit taxes are available, the difficulty of tracking annual production costs and the low likelihood of punishment may lead potential taxpayers to choose informality over the comparably high cost of profit tax compliance. Best, Brockmeyer, Kleven, Spinnewijn, and Waseem (2015) show that, despite introducing distortions to production, providing simpler options like turnover taxation can be efficient when opportunities for evasion are high. Yet despite its increasing use[2], little is known about the production and revenue implications of this method of taxing firm income. This project seeks to provide new empirical evidence on how firms respond to changes in turnover taxation by examining a reform in Rwanda.

In June 2012, Rwanda implemented an income tax reform that simultaneously reduced the marginal tax rate for firms participating in an existing turnover tax regime and introduced an optional lump sum tax regime on turnover — termed a "Flat Tax" — for small and micro-sized firms. Before the reform, firms subject to the turnover schedule paid a 4% tax on annual turnover, declared once at the end of each fiscal year. With the stated goal of broadening the tax base — by encouraging entry to the formal sector (and discouraging exit), as well as more complete declaration of taxable income — the Rwandan government reduced the marginal tax rate on turnover to 3% and introduced an optional tiered lump sum tax schedule for firms with less than 12 million Rwandan francs (USD $19,000) in annual turnover. This lump sum schedule also introduced an exemption threshold at 2 million Rwandan francs (USD $3,000), below which firms are still required to report turnover but face zero income tax liability. Figure 1 shows the structure of the income tax system before and after the reform. As a result, approximately 86% of formal sector firms experienced a 25 to 100% reduction in their annual tax liabilities[3], while the marginal rate faced by firms in the profit tax regime remained constant at 30%. The structure of this reform offers a novel opportunity to quasi-experimentally evaluate the production and tax base implications of three tax instruments — a tax cut, lump sum imposition of liabilities, and the introduction of a tax exemption — in a low income country. The quasi-experimental results discussed below ground the design of the survey and information experiments, which are intended to shed light on the observed responses of firms.

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[2]Coolidge and Yilmaz (2016) provide a discussion of the development of simplified turnover regimes across the developing world. Other African countries have adopted similar flat tax regimes recently. As of 2014, five other African countries had implemented "presumptive" tax regimes levying lump sum taxes across ranges of turnover: Cameroon, South Africa, Tanzania, Zimbabwe, and Uganda have variants of these tax regimes for small and micro-sized firms (ATAF, 2016).

[3]Firms opting for the lump sum schedule and declaring less than 2 million Rwf in turnover face a lump sum tax of 0 Rwf, therefore their tax burden decreased by 100%.

The data we use for the quasi-experimental analysis and survey sampling consists of the population of income tax declarations filed to the Rwanda Revenue Authority (RRA) between 2008 and 2016. We match monthly and quarterly value-added tax (VAT) declarations, payroll tax declarations (PAYE), and data on imports collected by the customs authority to the income tax returns of firms. The variation over time in tax rates faced by particular types of firms motivates a set of difference-in-differences-style empirical approaches.

In the quasi-experimental analysis, we find first that reducing the tax burden — conditional on the amount of a firm's tax liability remaining positive — and altering the mode of imposition (marginal to lump sum) have no aggregate impact on the tax base: a greater number of new firms do not opt into the tax base — or a greater number of existing taxpayers remain, relative to the pre-reform period — as a result of these changes, nor does the tax cut spur firms already in the tax base to declare more income. Second, firms do respond in ways that increase the tax base (along the intensive margin) but only to the imposition of the exemption threshold below which tax liability becomes zero. Firms affected by the introduction of this threshold (those located below the threshold pre-reform) on average double reported taxable income and increase tax payment by 60% from previous levels. Figure 2 shows the main effect for the intensive margin responses. This is a surprising finding regarding how taxpayers respond to "to-zero" reforms in a low enforcement environment, and runs counter to the unique existing study on this topic, where Waseem (2017) estimates positive taxable income responses in Pakistan to the introduction of an exemption threshold but negative impacts on tax due. For this behavior to fit with traditional models of evasion (Allingham and Sandmo, 1972), firms would need to overestimate the likelihood of experiencing enforcement by of 2 to 7 times. Though this interpretation is consistent with new evidence that suggests that firms do not respond optimally to enforcement signals (Bergolo, Ceni, Cruces, Giaccobasso, and Perez-Truglia, 2017), we additionally find suggestive evidence that taxpayers are significantly affected by the behavior of peers. Focusing on the declaration behavior of linear regime taxpayers who are legally unaffected by the flat tax regime, we observe that these firms are sensitive to the behavior of their local industry peers in ways that distort their declaration decisions away from the marginal tax incentives they encounter within their own regime. This suggests that firms may substitute signals from peers for true knowledge about the tax structure. These mechanisms may moreover be simultaneously present. Alternatively, we consider models of rational taxpayer response that could produce the

observed distribution of taxable income post-reform.

This survey and experiment detailed in this pre-analysis plan are focused on indentifying which mechanisms drive the observed responses of taxpayers to the 2012 reform. In particular, we concentrate on collecting detailed information about taxpayers who are affected by the introduction of the exemption threshold and who respond, on average, by increasing both taxable income and tax paid. The sample will be comprised of 500 taxpayers who declared less than the exemption threshold and 500 taxpyers who declared above the exemption threshold, in recent years, in order to identify the characteristics along which these groups differ. The information experiments are designed to measure how taxpayers in the sample respond to information about (1) the likelihood of experiencing an audit from the tax authority and (2) the compliance decisions of local peers. Outcomes will be assessed through a survey experiment approach and by observing the actual post-treatment tax declarations made by firms in the sample.

This project relates to several bodies of literature. First, it seeks to contribute to the growing set of studies estimating responses to the design of tax regimes in developing country settings along intensive and extensive margins, which document how theory and estimation techniques designed for analysis of developed countries must be adjusted to account for issues like evasion and limited enforcement capacity (Bachas and Soto, 2017; Best, Brockmeyer, Kleven, Spinnewijn, and Waseem, 2015; Kleven and Waseem, 2013; Waseem, 2018). This paper applies similar quasi-experimental approaches to the Rwandan context of simplified turnover income taxation, providing the first empirical estimates of responses to tax regimes of this type among firms in a low income country. Second, the results of this analysis are intended to contribute to literature on the design of tax regimes of this type, adding to the nascent body of work exploring tax policy in the poorest countries (Almunia, Hjort, Knebelmann, and Tian, 2017; Balan, Bergeron, Tourek, and Weigel, 2017; Weigel, 2017). Recent studies explore the implications of simplified income taxation of firms in governments' pursuits to build their tax bases and find that the optimal strategies are often context-dependent, shifting with the character of evasion and taxpayer type (Coolidge and Yilmaz, 2016; Gordon and Li, 2009). We hope to provide evidence — through the survey and experimental design — on the mechanisms driving the behavior of firms in these contexts.

This document is organized as follows. Section 2 outlines the conceptual framework, Section 3 describes the research design, Section 4 the survey instrument, Section 5 the dependent and

independent variables, Section 6 the main hypotheses, Section 7 ethical considerations, and Section 8 the timeline .

2   Conceptual Framework

The responses of taxpayers to the 2012 income tax reform observed in the quasi-experimental analysis on administrative declarations are consistent with several potential mechanisms. The following sections describe the theory behind each.

2.1   Overestimating probability of enforcment

Under perfect tax enforcement, evasion is zero, and firms should respond to changes in the size of their tax burden and to changes in the marginal tax rate. Tax reform in this setting carries implications on production, and the social planner must balance distortions to the production decisions of firms against a revenue requirement. However, when enforcement is weak and firms have substantial flexibility in evading tax liabilities, firms may respond to the changes in their tax burden and marginal tax incentives in ways that differ greatly from those observed in the perfect enforcement case (Bergolo, Ceni, Cruces, Giaccobasso, and Perez-Truglia (2017)).

We may consider the decisionmaking process of the firm in a setting of weak enforcement as one driven by minimizing contact with tax oversight. Firms produce and collect revenues that are unobservable to the tax authority, and then decide the amount of taxable income to report by determining the minimum amount it is possible to declare without their evasion being detected and punished. Determining the likelihood of punishment can be a complex calculation that depends on the degree of tax oversight a given firm experiences or perceives. Additionally, the relative complexity of tax compliance — logging turnover, declaring quarterly, and transferring tax due to the authority — in a context where literacy is low may direct firms to make uniformed decisions based on limited information about the enforcement environment — relative to the true risk of punishment — in ways that produce inefficient choices.

In this basic model of tax compliance, firms make tax decisions with the information most available to them. Under weak enforcement, if the goal of firms is to minimize tax payment conditional on avoiding punishment, we may expect no changes in declaration behavior in response to reduc-

tions in the tax burden and marginal rate, as firms will only respond to changes in the likelihood of their evasion being detected. However, when enforcement shifts, either in real terms or in the perceptions of taxpayers, such changes may be more powerful in motivating responses than changes to tax liability (Pomeranz (2015)).

The 2012 income tax reform, which lowered the tax burden for small and micro firms and attempted to simplify tax compliance by reducing administrative costs to tax declaration, may have altered firms' perceptions of the likelihood of encountering direct enforcement. For example, the thresholds imposed by the new Flat Tax may may have represented to taxpayers a change in the enforcement approach of the Rwanda Revenue Authority. In this case, the reform could be understood as shaping decisions regarding how much information they reveal to the tax authority and how much tax liability they can evade, rather than as necessarily distorting production decisions or affecting how firms respond to marginal tax incentives. In reality, the likelihood of enforcement did not change for small firms post-reform, according to available evidence on audits and reviews from the Rwanda Revenue Authority. To our best estimate, the likelihood of experiencing an audit or review for small firms remained less than 1 percent before and after the reform. If the observed responses are driven by responses to enforcement, this would suggest that it is not real changes in enforcement but perceived changes in the likelihood of experiencing enforcement that cause this behavior.

2.2 Peer influences on compliance decision

Conversely, taxpayers may be influenced in their compliance decisions by the behavior of their peers. Evidence from other settings shows that individual taxpayers can be responsive to signals or information on the tax structure within the business environment (Best (2014)). Correlational evidence for this theory in our context is found in the administrative declarations by observing the declaration behavior of taxpayers who opt to remain in the pre-existing "linear" tax regime, with a marginal tax rate of 3 percent. Figure 3 shows bunching responses among linear regime firms by heterogeneity in the choices of local Flat-Tax-opting peers. Linear regime taxpayers begin to locate at the notches introduced by the Flat Tax despite having no tax incentives to do so — in fact, the tax liability at these notches is in almost all cases greater than the tax liability under the Flat Tax regime (see Figure 1). Given this evidence, it is also possible that taxpayers within the Flat Tax

regime also respond to the behavior of peers, but it is not possible to measure such behavior in this setting as declarations are observed only at the conclusion of each fiscal year, and therefore we lack the finer time variation needed to capture the sequence of decision-making around how firms decide how much to declare.

2.3 Rational herding

A third potential mechanism is rational herding by taxpayers. If enforcement is uniform across the taxable income distribution (at least among small taxpayers) in the sense that discrete numbers of taxpayers are selected for audit or review within particular income "bins", and taxpayers understand this to be the prevailing method of enforcement, then if the reform induced some taxpayers to increase their taxable income declarations — out of overestimations of the audit likelihood or higher degrees of risk aversion — then for those remaining in an income bin exited by such taxpayers, the likelihood of experiencing actual enforcement increases marginally with each exit. If, for example, the taxpayers with the highest perceived probability of experiencing an audit or review (or having higher levels of risk aversion) respond to the introduction of the exemption threshold by moving out of the exemption zone (in order to pay some positive amount of taxes), then for those remaining below the exemption threshold, the actual probability of enforcement increases. This could induce herding as taxpayers sequentially move out of their bin below the exemption threshold as the enforcement likelihood changes, where movement begins with the taxpayers with the highest perceived probability of audit or review (or highest risk aversion), proceeds to the next highest, and terminates with the taxpayers for whom their perceived likelihood of audit or risk aversion makes the decision to remain in the exemption zone and to move above it equivalent in terms of payoffs.

This theory relies heavily on two assumptions: (1) that enforcement is (at least in the minds of taxpayers if not in reality) uniform across income bins and structured around sampling numbers rather than proportions of taxpayers for audit or review, and (2) that taxpayers have some knowledge about the declaration decisions of their peers. Enforcement (audits and reviews) among taxpayers of this size do appear approximately uniform in the RRA data. Suggestive evidence for this herding hypothesis also appears in the fact that extremely large numbers of taxpayers locate precisely to the right of the exemption zone (exactly at 2 million RWF), where tax liability becomes positive. Figure 4 shows the amount of bunching at this point over time. While also consistent with peer

influences, this mechanism may also embody the reason behind the strong correlations between the behavior of taxpayers and their local peers.

3   Research Design

To test the research questions and determine which of the hypothesized mechanisms are operating behind the responses observed in the quasi-experimental analysis, we propose to conduct a survey and field experiment among small taxpaying firms across Rwanda between January and March 2018. The survey will be conducted with 1,000 taxpayers to assess differences across observed levels of declared taxable income. The experiment will randomly assign taxpayers to receive information about (1) the likelihood of experiencing an audit from the tax authority and (2) the compliance decisions of local peers. Outcomes will be assessed through a survey experiment approach and by observing the actual post-treatment tax declarations made by firms in the sample. In the audit arm, taxpayers will either receive information communicating to them, if they declared (a) taxable income above the exemption zone in previous years, that the true likelihood of experiencing and audit or review for their income tax declarations for fiscal year 2017 (due March 31, 2018) is low; taxpayers declaring (b) taxable income within the exemption zone in previous years will receive information communicating to them that the audit likelihood for their upcoming income tax declarations is high. In the peer information arm, taxpayers in group (a) will receive information about the proportion of taxpayers like them who choose to locate below the exemption zone; taxpayers in group (b) will receive the opposite information. The peer information treatments are cross-randomized within the audit arms (so that half of taxpayers receiving audit information also receive peer information and half do not); no taxpayers receive only peer information. We chose not to treat each group of taxpayers with all possible combinations of the treatment arms for two reasons: first, the behavior of interest is the decision whether to locate in or outside of the exemption zone — observing whether taxpayers in the zone further reduce declared amounts or if taxpayers above the zone further increase declared amounts does not address this behavior; second, the limitations of the sample size led us to maximize the power with which we would be able to detect effects for the outcomes of interest. Table 1 shows the experimental design and sample allocated to each treatment arm.

(1) Audit information (high vs. low) Information on the likelihood of experiencing an audit

will be drawn directly from Rwanda Revenue Authority data on audits and reviews for fiscal year 2016. The information communicated to taxpayers will provide either a high or low number of audits. For the high audit probability group, taxpayers having declared turnover previously within the exemption zone (below 2 million RWF) will be told that the RRA conducted 1,243 audits or reviews of taxpayers like them and that this represents a high number of audits and a high audit likelihood. For the low audit probability group, taxpayers having declared turnover previously just to the right of the exemption zone (at 2 million RWF) will be told that the RRA conducted only 37 audits of taxpayers like them — computed by observing audits in fiscal year 2016 for the income bin from which the sample will be drawn, 0 to 4 million RWF — and told that this represents an extremely low audit likelihood for taxpayers like them. Both of these numbers are the true number of audits or reviews conducted by the RRA in 2016; the only thing shifting is the definition of "taxpayers like you".

(2) Peer information (above vs. below exemption zone) Information about the behavior of peers will be crossed with the audit treatments only. The high audit treatment will be crossed with information provided about the proportion of taxpayers (30%) like the respondent choosing to locate at precisely 2 million RWF (just to the right of the exemption zone). The low audit treatment will be crossed with information about the proportion of taxpayers like the respondent who locate within the exemption zone (37%). "Taxpayers like the respondent" is defined for everyone as having declared between 0 and 4 million RWF previously, and the proportions are drawn from RRA data on the population of taxpayers for fiscal year 2016.

(3) Control Taxpayers assigned to the control group will receive a placebo message about the proportion of taxpayers like them who declared their income tax returns on time before the official deadline for fiscal year 2016 (95%). This information could shift when taxpayers declare relative to the other information treatments but should not affect the amount of income declared as it only communicates information about the timing rather than the content of income tax declaration.

The content and sequence of the information treatments can be found in the attached survey instrument. Taxpayers in each treatment arm will also receive follow-up text messages containing the same information just before the tax deadline to reinforce the information provided during the survey.

3.1 Sampling Strategy

Taxpayers will be randomly sampled from the population of those declaring positive (greater than zero) taxable income for fiscal years 2015 or 2016 in the RRA administrative data. An equal number of taxpayers (500 taxpayers) will be drawn from one of two groups: (1) taxpayers having declared more than 0 but less than 2 million RWF and (2) taxpayers having declared precisely 2 million RWF. The purpose of drawing from these two groups is to provide evidence on the mechanisms behind the behavior observed in the quasi-experimental setting. Specifically, why some taxpayers decided to increase declared taxable income and tax payment when the reform reduced official tax liability to zero (Group 2) and why some taxpayers did not increase declarations and declared income post-reform that placed them within the exemption zone (Group 1). Taxpayers will be randomly sampled from the pool comprising the population of taxpayers within each group for fiscal years 2015 and 2016[4]. No additional stratification will be imposed on the selection of the sample.

As the survey process must be completed before the tax deadline of March 31, 2018, the total sample size here may be an overestimate of the number we are able to include, given that this depends on the response rates of firms and the ability to which we are able to identify those who have not yet declared before the deadline, the proportion of which among the available sampling pool will decline as the deadline approaches.

3.2 Randomization

The unit of randomization for the information treatments is the taxpayer firm. Each of the 1,000 firms will be randomly assigned to a treatment group (depending on the sample group to which they belong) with equal probability. Randomization will occur within the survey instrument: a random number will be generated by the tablet used to conduct the survey and this number will be used to assign the respondent to a treatment arm during survey data collection. We are not able to randomize ex ante due to concerns about differential response rates — within-survey randomization ensures that all taxpayers who reach the treatment section of the survey instrument have equal probability of being assigned to possible arms within their sample group.

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[4]Taxpayers in the transportation sector will be dropped as these taxpayers belong to a special tax regime that involves quarterly lump sum payments that are set intermittently through special agreements made between the Rwanda Revenue Authority and transportation companies.

We are reasonably confident that spillovers in our context are not a concern. The individual level treatments will only be provided to individual businesses, the locations of which we can observe in the RRA administrative data. It is possible that taxpayers could share the information they receive with others in our sample, but given that the sampling frame is the entire population of taxpaying firms declaring between greater than 0 but less than or equal to 2 million RWF (approximately 15,000 firms), we expect the probability of interactions between taxpayers within our sample to be extremely low. We can test ex post whether geographic locations with a greater (lesser) diversity of treatment assignment have attenuated (strengthened) responses to information; however, assessing spillovers will not be a focus of this study.

4 Survey Instrument

We will administer surveys once over the phone to a sample of 1,000 firms.

The survey instrument in Appendix A shows the full range of questions, which cover the following topics:

1. Demographics of owner

2. Firm characteristics

3. Interactions with other businesses or entities

4. Sources of information

5. Risk aversion

6. Access to and satisfaction with public services

7. Trust of government institutions

8. Experiences with taxation

9. Experiences with tax enforcement

10. Perceptions of audit or review likelihood

11. Past and prospective income tax declarations

5   Dependent and Independent Variables

We will collect two types of outcomes: (1) self-reported measures of the perceived likelihood of experiencing an audit or review and the amount of taxable income the firm intends to declare for fiscal year 2017; and (2) administrative income tax declarations made to the Rwanda Revenue Authority for fiscal year 2017.

5.1   Firm-Level Outcomes from Survey

From the survey data, we will collect three main self-reported outcomes post-treatment. Each of these measures will also be collected pre-treatment, elicited through exactly the same framing. The pre-treatment measures will be asked early on in the survey and the post-treatment measures will be asked at the very end, separated from the information experiment by an unrelated survey section. The post-treatment collection will be preceded by a script telling respondents: "Now I am going to ask you some questions again that I have already asked you. Some people like to keep their answer the same and some people like to change their mind". The change in these outcome measures pre- and post-treatment will be compared within taxpayers in a survey experimental approach:

1. *AuditLikelihood_Survey*: Self-reported measures of likelihood of the respondent experiencing an audit or review for their income tax declarations for fiscal year 2017; elicited both on a 4 point scale (Not at all likely to Absolutely certain) and as a percentage probability

2. *AuditLikelihoodPeer_Survey*: Same 4 point scale measure as above but asked about the likelihood of businesses like the respondent's receiving an audit or review

3. *TaxableIncome_Survey:* Self-reported amount of annual taxable income the respondent intends to declare for fiscal year 2017

5.2   Firm-Level Outcomes from Administrative Data

From the administrative data on tax declarations for fiscal year 2017, we will observe the content of the declaration and the tax payment. These outcomes are considered separately as some taxpayers declare but do not pay the tax owed:

1. *Declare_Admin*: Whether the firm submits an annual income tax declaration to the RRA for fiscal year 2017

2. *DateDeclaration_Admin:* The date the annual income tax declaration is submitted to the RRA for fiscal year 2017

3. *TaxableIncome_Admin*: Amount of declared annual taxable income for fiscal year 2017

4. *TaxPay_Admin*: Whether the firm makes an income tax payment for fiscal year 2017

5. *DateTaxPay_Admin*: The date the annual income tax payment is submitted to the RRA for fiscal year 2017

6. *TaxAmount_Admin*: Amount of income tax payment made for fiscal year 2017

7. *QuarterlyDeclarations_Admin:* After the close of fiscal year 2017, quarterly income tax declarations for fiscal year 2018 due at the end of each fiscal quarter will be measured to observe whether any effects on declarations persist over time

8. *QuarterlyPrepayments_Admin:* After the close of fiscal year 2017, quarterly prepayments for fiscal year 2018 due at the end of each fiscal quarter will be measured to observe whether any effects on declarations persist over time

9. *OtherTaxes_Admin:* For both fiscal year 2017 and 2018, declaration and payment of other taxes (VAT, PAYE, fees)

5.3 Treatment/Independent Variables

1. *AUDIT*: Indicator for firm receiving information about the likelihood of audits or reviews conducted by the Rwanda Revenue Authority for businesses like the firm's for fiscal year 2016, ranging from *HIGH* to *LOW*

2. *PEER* Indicator for firm receiving information about the proportion of peers declaring above (*ABOVE*) or below (*BELOW*) the exemption threshold of 2 million RWF

5.4 Firm Characteristics

1. *Demographics_Owner:* We will collect measures of owner individual characteristics, like age, gender, education, risk aversion, trust of institutions, and social networks

2. *Firm_Attributes:* These variables will include the attributes of the firm, including number of employees, industry sector, location, access to public services, investments, and turnover

3. *Enforcement_Experiences:* These variables will include measures of the firm's previous experiences (and views about) enforcement of tax obligations by the RRA

6 Analysis and Main Hypotheses

This section presents the main specifications for the analysis regarding the outcomes and treatment variables described in section 5. We discuss our main hypotheses surrounding the effect of the treatment interventions on the primary outcomes as well as secondary outcomes and heterogeneity predictions by owner and firm characteristics.

We will estimate effects using an intent-to-treat framework. For firm-level outcomes Y_i where i indexes the firm, we will run the following regression:

$$Y_i = \beta_0 + \beta_1 \text{Treatment}_i + \theta X_i + \varepsilon_i \text{ (1)}$$

where Treatment_i corresponds to different combinations of the treatment variables described in Section 5.3, X_i corresponds to owner or firm level characteristics including pre-treatment baseline measures of the outcome variable, and ε_i is the error term.

6.1 Audit Likelihood

We begin by discussing the hypotheses surrounding the average effect of providing information about the likelihood that the RRA will select the respondent's business for an audit or review, based on information drawn from RRA administrative data for fiscal year 2016. It is important to note here that the treatment does not guarantee that the respondent updates their beliefs about audit or review likelihood after receiving this information, only that the information provided is intended to communicate that this likelihood is high or low for firms of the respondent's type. Given seemingly

low levels of knowledge about RRA enforcement practices (national audit statistics are not public information), we expect the treatments to — if they are effective — increase (decrease) the perceived likelihood among those who receive the high (low) audit information treatment, on average.

We first consider the treatment that provides information on audits and reviews that communicates a high expected likelihood that the respondent's firm would be selected for audit or review for their upcoming annual income tax declarations for fiscal year 2017. This information will only be provided to taxpayers who declared taxable income within the exemption zone (below 2 million RWF) in previous years.

$$Y_i = \beta_0 + \beta_1 \text{Audit\_High}_i + \theta X_i + \varepsilon_i \ (2)$$

[H1] The high audit likelihood information treatment will (on average) increase the perceived likelihood of audit and review among the treatment group ($\beta_1 \geq 0$), as reported in the survey experiment measures.

[H2] The high audit likelihood information treatment will (on average) increase the amount the respondent firm reports intending to declare (survey experiment) and actually declares for fiscal year 2017 (administrative data).

We next consider the treatment that provides information on audits that communicates a low expected likelihood that the respondent's firm would be selected for audit or review for their upcoming annual income tax declarations for fiscal year 2017. This information will only be provided to taxpayers who declared taxable income above the exemption zone (at or above 2 million RWF) in previous years.

$$Y_i = \beta_0 + \beta_1 \text{Audit\_Low}_i + \theta X_i + \varepsilon_i \ (3)$$

[H3] The low audit likelihood information treatment will (on average) decrease the perceived likelihood of audit and review among the treatment group ($\beta_1 \leq 0$), as reported in the survey experiment measures.

[H4] The low audit likelihood information treatment will (on average) decrease the amount the respondent firm reports intending to declare (survey experiment) and actually declares for fiscal year 2017 (administrative data).

6.2 Peer Information

Next we describe hypotheses regarding the treatments varying information shared about peer declaration choices. As shown in Figure 3, substantial numbers of taxpayers locate at precisely 2 million RWF, though sizeable proportions also locate below or above this point. The objective of these treatments is to share information about the proportion of peers declaring different amounts of taxable income than the respondent in order to assess whether sharing this information shifts how the respondent views the likelihood of experiencing enforcement or the amount of taxable income they intend to declare. As the peer treatments are crossed with the audit information treatments, the hypotheses below focus only on the additional effect of peer information (among those receiving either audit treatment) to hold constant the affect of this information. The following section will discuss interactions.

Those declaring within the exemption zone will receive information about the proportion of peers ("taxpayers like you") locating at 2 million RWF (30 percent).

$$Y_i = \beta_0 + \beta_1 \text{Peer\_Above}_i + \theta X_i + \varepsilon_i \ (4)$$

[H5] The effect of the peers above information treatment on the perceived likelihood of audit and declarations is ambiguous: if, for example, taxpayers believe audits imposed across the taxable income distribution are proportional to the number of taxpayers locating at each point, then updating taxpayers' beliefs about the shape of the local taxable income distribution — that many more of their peers than they had previously thought locate at 2 million RWF (while they have located below 2 million RWF) — could reduce perceived likelihood of audit as taxpayers may become more inclined to think that audits would focus more on the mass above them than on taxpayers in the range in which they locate below the exemption threshold. Conversely, if the rational herding muchanism is true — that audit selections are uniform in number across the taxable income distribution — then this treatment could increase the perceived likelihood of audit as taxpayers may update positively about how many of their peers declare more than they do, meaning the likelihood of receiving an audit is mechanically higher than they had previously thought (since the tax authority is more likely to choose them within their income bin the lower number of taxpayers there are in that bin). For this reason we are agnositic about the impact of the peers above information treatment on the perceived likelihood of audit and declaration amounts, but will use the results to adjudicate

among possible mechanisms.

Those declaring at or above 2 million RWF will receive information about the proportion of peers locating within the exemption zone but declaring more than zero (37 percent).

$$Y_i = \beta_0 + \beta_1 \text{Peer\_Below}_i + \theta X_i + \varepsilon_i \ (5)$$

[H6] As in hypothesis [H5], we are agnostic about the impact of the peers below information treatment on the perceived likelihood of audit and declarations — this depends on how taxpayers understand the audit selection process of the tax authority.

6.3 Interactions

The peer information treatments will be crossed with the audit treatments (no peer-information-only groups). For the high audit likelihood and peers above treatments, we will estimate the following regression.

$$Y_i = \beta_0 + \beta_1 \text{Audit\_High}_i + \beta_2 \text{Audit\_High}_i \times \text{Peer\_Above}_i + \theta X_i + \varepsilon_i \ (6)$$

[H7] Given our lack of prediction on the direction of the peers above information treatment, we also do not specify a hypothesis regarding the direction of the interaction term as it will depend on the mechanism at work.

For the low audit likelihood and peers below information treatments, we will estimate the following regression.

$$Y_i = \beta_0 + \beta_1 \text{Audit\_Low}_i + \beta_2 \text{Audit\_Low}_i \times \text{Peer\_Below}_i + \theta X_i + \varepsilon_i \ (7)$$

[H8] We are also agnostic about the direction of the audit low and peers below interaction term for the same reason.

[H9] We are agnostic about the magnitude of the effects between the audit information only and audit plus peer information groups (whether $|\beta_1| > |\beta_2|$ or if $|\beta_1| < |\beta_2|$). However, the above-mentioned potential mechanisms provide a framework for identifying the most likely mechanism by comparing the size of each effect.

6.4 Conditional Hypotheses: Heterogeneity by Owner and Firm Characteristics

In this section we discuss hypotheses related to heterogeneous characteristics of respondents (owners and firms). In the following estimating equation, Z_i is a variable capturing some hetergeneous characteristic of the firm.

$$Y_i = \beta_0 + \beta_1 \text{Treatment}_i + \beta_2 \text{Treatment}_i \times Z_i + \beta_3 Z_i + \theta X_i + \varepsilon_i \ (8)$$

[H10] Firms with more educated owners or owners who are more experienced in business and firms that are older, on average, will respond systematically less to the treatments as these businesses are more likely to already be informed about the true state of enforcement and peer behavior and therefore will update and respond less than their counterparts.

[H11] Firms with owners who are reltaively more risk averse will respond more to the high audit treatment and less to the low audit treatment in both updating perceived audit likelihood and declared taxable income as this response (in both cases) declaring and paying more in taxes. Likewise, first with greater contact with past enforcement (visits by RRA officials, audits, or reviews) will respond in a similar fashion as they will be more averse to risking punishment due to their previous negative encounters with it.

[H12] We are agnostic regarding whether firms that are more socially connected to peers — through business or outside of business — and who consult more often with peers will be more likely to respond to the peer information treatments. The impact of the peer information treatments may be decreasing in the amount of existing peer information firms have, but such firms may also be more susceptible to the influence of peer behavior to begin with.

[H13] Firms that have greater trust in government institutions and greater access to services will respond more to the high audit and peers above information treatments and less to the low audit and peers below information treatments compared to their counterparts, if the peer treatment effects move in the same direction as the audit treatment effects. These responses would entail (on average) increasing the amount of tax due, and such firms are more likely to be amenable to such behavior given their higher satisfaction and trust in the state.

[H14] We are agnostic regarding whether firms that pay more in local or national taxes will respond in their declared taxable income more or less strongly to each treatment. For example, it's possible that such firms will respond less to the high audit and peers above treatments and more

to the low audit and peers below treatment as declaring more in taxable income entails a greater amount of income tax (on average), if these effects move in the same direction. However, it is also possible that firms that more often voluntarily comply with other tax obligations may respond more strongly to the high audit/peers above treatments and less strongly to the low audit/peers below treatments as they are more willing in general to pay greater amounts of taxes.

6.5   Other Taxes and Dynamics

The increase in tax paid observed in the quasi-experimental analsysis among those affected by the introduction of the exemption threshold shows mixed evidence in terms of crowding-out or -in effects on other taxes paid by these firms. The total amount of taxes paid increases post-reform by a similar magnitude to the increase in income taxes paid. Though the proportion of taxpayers of this size that are also subject to value-added taxes (VAT) is less than 5 percent, there is suggestive evidence from the quasi-experimental analysis that the reform's impact on declared taxable income also increased the size of VAT declarations and amount of total VAT paid in the post-reform period for those subject to this tax. We interpret this as a spillover effect of the income tax response — firms declare more in income tax and must match their aggregate VAT declarations to the amount they declare in the income tax base in order for these numbers to match up — but one that operates through purely through an evasion channel. In other words, the reform did not also increase the amount of sales, but firms reduced the amount of sales they previously underreported to agree with the increased size of their annual income tax declaration amounts. Other taxes such as PAYE or service fees do not have the same relationship with income tax declarations.

[H15] The information treatments will have the an effect on VAT declarations in the subsequent fiscal year of the same direction as those on annual income tax declarations for fiscal year 2017 $(|\beta_k| \geq 0)$.

[H16] The information treatments will have no effect on the amount of declarations or amount of taxes paid for other taxes that are unrelated to income tax declarations, including PAYE, customs taxes, and other service fees $(\beta_k = 0)$.

We will continue to track the declarations of respondents over the following fiscal year. We expect any effects observed on the annual declarations for fiscal year 2017 may persist through the following fiscal year due to the practice of quarterly prepayments which require taxpayers to prepay

on a quarterly basis one quarter of the tax amount corresponding to their reported taxable income for fiscal year 2017. Therefore any observed readjustment would happen the following March 2019. However, as choices appear sticky — the amount of taxable income declared often persists over time — we expect any observed impacts to appear in subsequent periods, holding constant the information available to taxpayers and the audit structure of the tax authority.

[H17] Declared annual taxable income for fiscal year 2018 will be of the same direction as the effects for the upcoming declaration period but not larger $(|\beta_{k,t}| \geq |\beta_{k,t+1}| > 0)$.

6.6 Adjudicating Among Potential Mechanisms

The results of the survey and experiment will permit assessing among the potential mechanisms to identify that which drives the results observed in the quasi-experimental analysis. If, for example, firms are only responsive to audit (peer) information, then this would suggest the overestimation of audit likelihood (peer influences) mechanism corresponds closest to reality. If instead both produce significant responses among sample firms, then this could suggest either that both mechanisms are at work or that rational herding hypohtesis may operate, depending on the size of baseline pre-treatment audit perceptions and the location of peers in the taxable income distribution.

The survey response will additionally shed light on the differences between the two groups of taxpayers (within or above the exemption zone). The ability to adjudicate among potential mechanisms will depend on the results of both the survey exercise and the results of the experiment.

6.7 Power

Given the concern noted in Section 3.1 regarding the ability to survey 1,000 respondents before the tax declaration deadline, we provide conservative estimates regarding power, estimated using the sampsi command in Stata. With a cell size of 250 observations (pooling both peer and audit treatments to assess whether taxpayers move in any direction), we are powered at $\alpha = 0.05$ to detect a 0.25 standard deviation effect with a power level of 80 percent. With cells of at least 400 observations, we are powered to detect a 0.2 standard deviation effect. Comparing the minimum sized cell of 150 observations to the control cell of 400 observations, we are able to detect a 0.27 standard deviation effect. While these minimum detectable effect sizes are not small, the change in behavior (increasing declarations above the exemption zone) that we hope to detect embodies an

approximate increase of at least 67 percent (on average) for taxpayers below 2 million RWF (if they move to 2 million RWF) and for taxpayers above, if they move below, an effect of similar magnitude if these taxpayers locate where their peers currently locate in the exemption zone. Therefore, we feel confident that this sample size will permit detection of effects on declared taxable income. Likewise, the information provided about audit communicates appreciably high and low levels of audit likelihood, meaning that if the information is credible it would entail updating perceptions to a substantial degree. Therefore, we also feel confident that we will be able to detect changes in the perceived likelihood of audit with this sample size through the survey experiment. For the peer information experiments, we believe these also provide strong information about peers that will be new information to most taxpayers. Their movement to the locations of the peers described in each message would entail the same sized responses as those discussed above, which are within the range of effects we are able to detect.

7 Ethical Considerations

7.1 Partners and Permissions

The researcher has a strong working relationship with the Rwanda Revenue Authority, which oversees tax collection and enforcement in Rwanda. The survey and experiment has received approval from the Rwanda National Institute of Statistical Research and the Harvard University Institutional Review Board.

7.2 Potential Risks to Respondents

The messaging and information experiments will contain no threat or attempt at intimidation, but will simply inform firm-owners about the enforcement practices of the RRA or provide information about the behavior of businesses like theirs. Therefore, we feel that the risks or discomforts posed to participants are not created by the study but are only a reflection of risks that exist in the current environment.

There is a low risk of breach of confidentiality. Survey responses, once collected, will be stored in an encrypted format and only coded data will be used by the researchers for analysis purposes. The researchers believe it is extremely unlikely that the RRA would try to obtain the identifying

details of survey respondents, for several reasons: (1) the taxpayers to be surveyed are among the smallest in terms of size and tax paid in the entire country — the survey explores tax compliance among small businesses, and the vast majority of RRA enforcement efforts are focused on the largest firms in the economy, which generate 90 percent of revenues, so the value of illegally obtaining (per Rwandan law) the survey responses of individual respondents would be low in terms of generating revenue from survey respondents by identifying those who are evading; (2) as mentioned in point (1), obtaining the survey responses would be illegal under Rwandan law, and if the RRA attempted to obtain these responses and were discovered by the researchers, the ability of the researchers to contact news agencies to expose such actions we believe would be a sufficient deterrent to prevent the RRA from considering taking such a step; (3) the researchers have been collaborating with the RRA since 2015 and have a strong relationship with RRA partners — we believe the RRA understands the value of collecting reliable estimates of possible evasion through the survey by ensuring that the responses would never be shared with the RRA (so that respondents feel comfortable providing such information) in order to inform enforcement policy; and finally, (4) identifying information about the size of firms was systematically collected in 2011 and 2014 as part of a Census of establishments by the Rwandan National Institute of Statistical Research (NISR) — this Census also collected the taxpayer identification number of the firms surveyed, but thus far NISR has refused to share this information with the RRA to protect the identity of their respondents as well as safeguard their ability to collect reliable responses in the future — therefore, we feel that the established standard in Rwanda is to permit researchers to collect information on firms that may relate to tax compliance and evasion without the fear of the RRA attempting to obtain that information for the purposes of targeting and punishing taxpayers who are evading.

8 Timeline

1. Experimental design: January 2018

2. Baseline survey + information treatments: February — March 2018

3. Follow-up SMS information treatment reinforcement: March 2018

4. Endline data collection from administrative records: April 2018

5. Data analysis: May — June 2018

6. Write-up: July 2018

7. Final analysis of outcomes: April 2019

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FIGURE 1: STRUCTURE OF INCOME TAX SYSTEM

A: Tax Structure Pre-/Post-Reform

B: Change in Effective Tax Rate
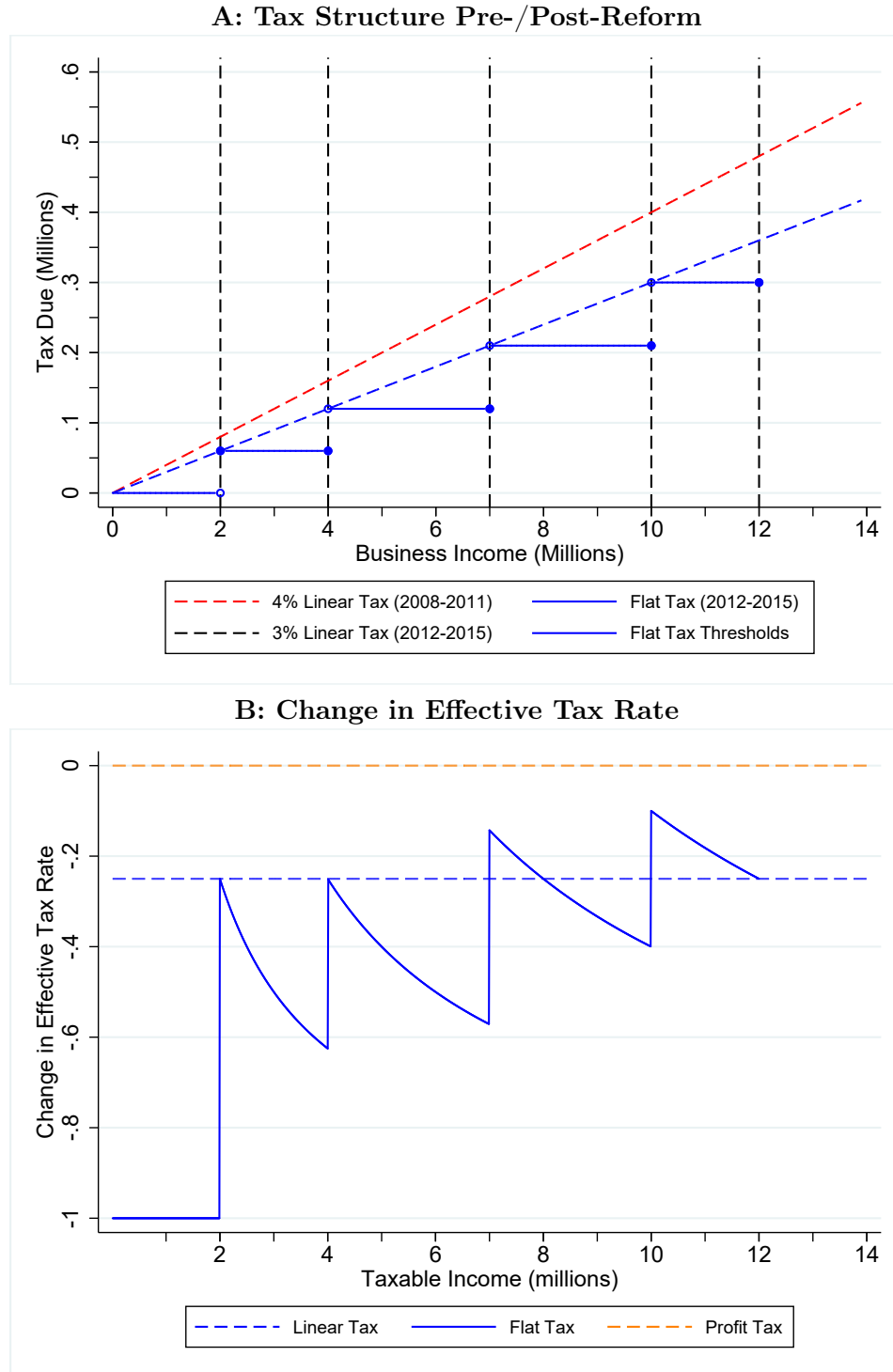
Notes: Panel A displays the income tax structure for firms with less than 14 million Rwandan Francs in annual turnover before and after the implementation of the 2012 income tax reform. The red dashed line corresponds to the 4% flat tax on turnover before the reform. The blue dashed line corresponds to the 3% linear tax rate on turnover starting in 2012, and the solid blue line shows the tiered structure of tax liability for the optional flat regime. The orange dashed line represents the 30% profit tax rate that remains unchanged throughout the period. Panel B shows the change in the effective tax rate in each regime implemented by the reform.

Figure 2: Intensive Margin Response (Balanced Panel)

A: Taxable Income — Below/Above 2 million RwF Turnover (2011)
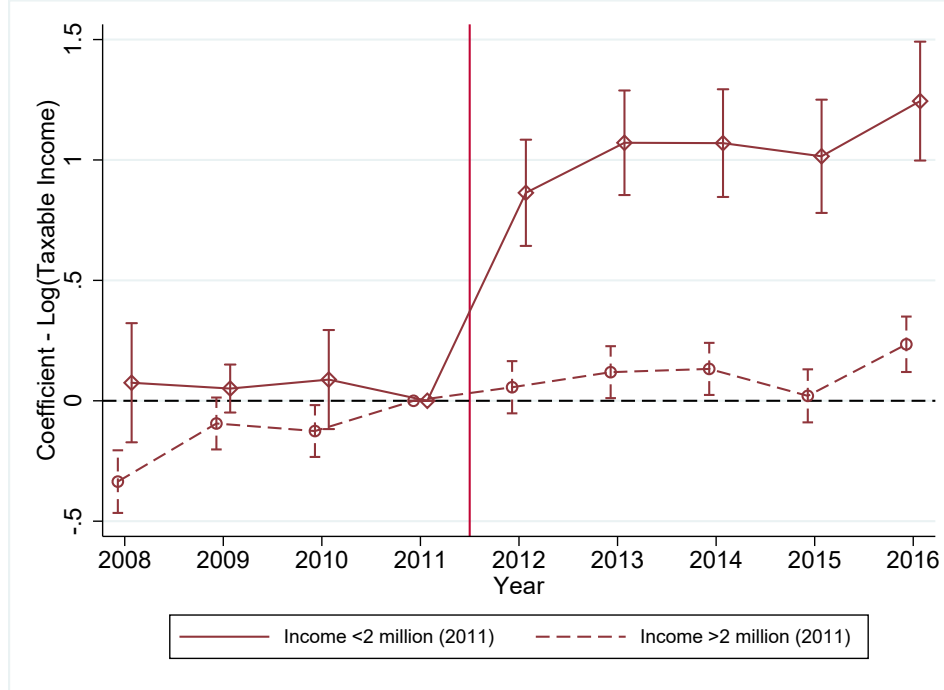
B: Tax Due — Below/Above 2 million RwF Turnover (2011)
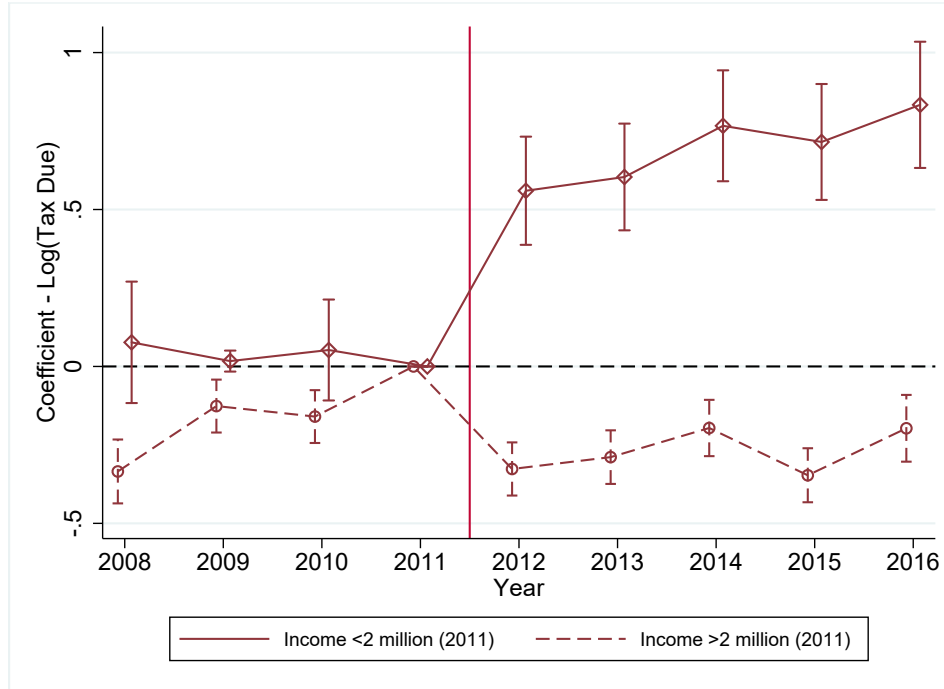
Notes: The figure shows the change in taxable income and tax due among taxpayers appearing at least three times in the pre-period and four times in post-period, across various levels of turnover in the pre-period. Estimate come from a difference-in-differences specification comparing turnover regime taxpayers to profit regime taxpayers who experience no change in regime.

FIGURE 3: BUNCHING OF LINEAR TAXPAYERS BY CHOICE OF PEERS

A: By Flat-Opting in Geo-Sector

B: By Flat-Opting in Geo-Sector and ISIC
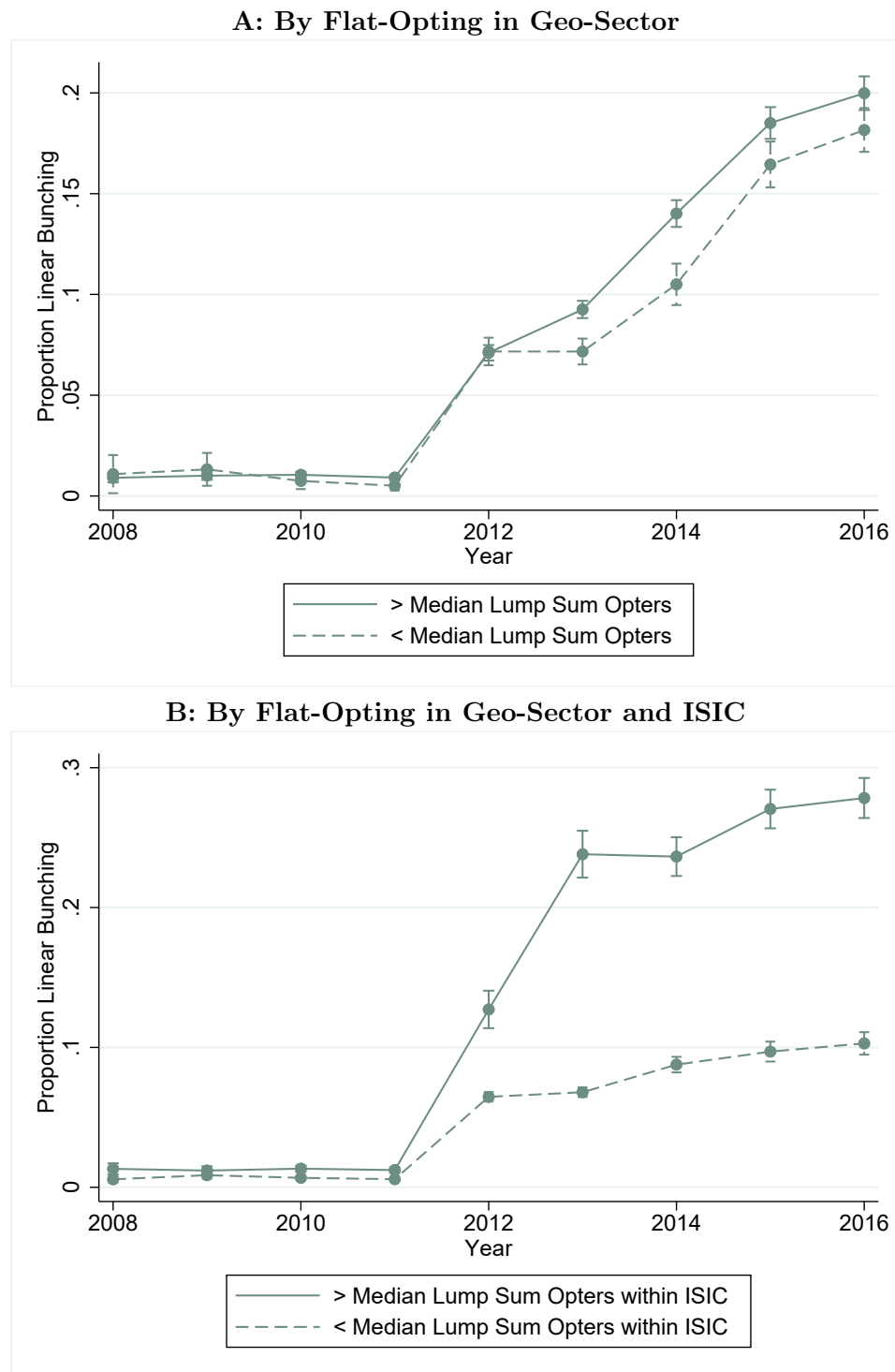
Notes: The figure shows the change in bunching by linear taxpayers by splits of geographic and geographic-industry levels of local peer choice of the flat regime in 2012.

Figure 4: Bunching at 2 million RwF Threshold
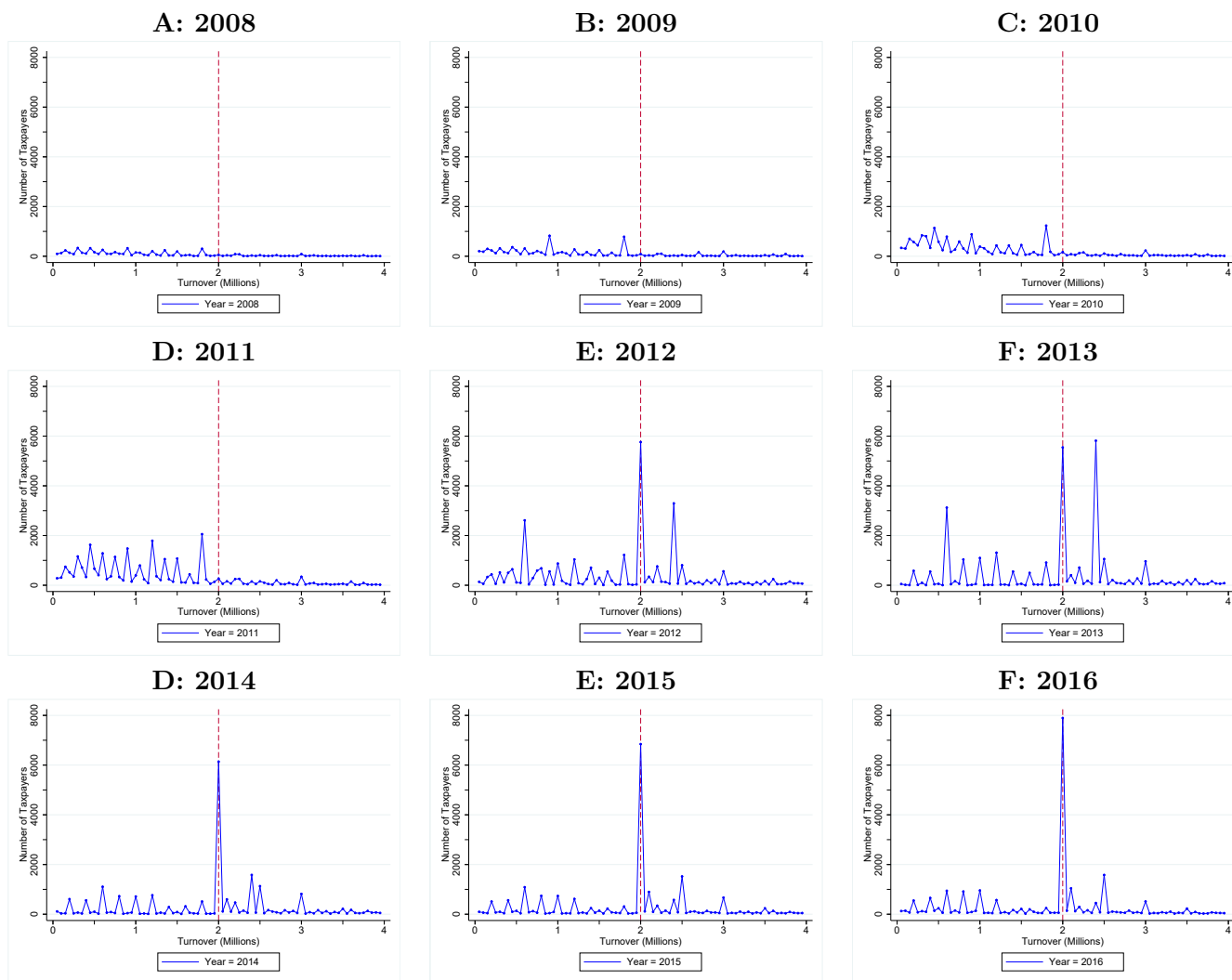
Notes: The figure shows the observed bunching among taxpayers around 2 million RwF in each year of the available data, between 1 RwF and 4 million RwF.

Table 1: Treatment Groups and Sample Size

	Audit High (300 taxpayers)	Audit Low (300 taxpayers)	Control arm (400 taxpayers)
No peer information (control)	150 taxpayers	150 taxpayers	400 taxpayers
Peer information below threshold		150 taxpayers	
Peer information above threshold	150 taxpayers		

Appendix A: Survey Instrument

Variable	Question
intro2	Before we begin the survey, I would like to ask some information about you.
sex	RECORD THE GENDER OF THE RESPONDENT WITHOUT ASKING.
age	How old were you on your last birthday?
education	What is the highest level of education you reached?
G3_2	**NON-OWNER DETAILS**
position	What is your position at ${business}?
employment_duration	How long have you been working at ${business}?
intro3	To understand a little bit more about the business I would like to ask some questions about the owner of the business.
age_owner	Approximately what age is the owner?
education_owner	What is the highest level of education that the owner has reached?
sex_owner	What is the gender of the owner?
G3_2	
G3	
G5	**BUSINESS CHARACTERISTICS**
industry_from_form	
district	In which district of Rwanda is this business located?
industry	What is the main business activity of ${business}?
business_age	Approximately how many years has ${business} been in operation?
employees_total	How many people are there working at this business other than the business owner(s)? This includes all permanent and causal or temporary employees.
locations	How many locations does your business have?

accounts	Does the business keep a detailed account of costs and sales?
accounts_type	How are these accounts kept?
declare_incometax2017	Have you already declared your income tax for 2017, or will you do so before the deadline on March 31st, 2018?

G5_1	**ALREADY DECLARED 2017**

alreadydeclared	Thank you for your time in completing the survey.
stop4	OK. SAVE AND EXIT THE SURVEY USING THE ARROW IN THE TOP RIGHT HAND CORNER OF THE SCREEN.

G5_1	
G5_2	**NETWORKS 1**
randapply	
business_area_n	Approximately how many businesses are located near to yours, by which I mean on the same avenue?
business_area_n_sector	Of those businesses located near you, how many are the same type of business as yours (the same industry sector ${industry})?
compete_local	How would you describe the level of competition among businesses in the same industry as yours where you are operating?
business_partners	Approximately how many other businesses do you do business with in a typical month? By "do business" I mean businesses you purchase from or sell to.
business_partners_type	Of those other businesses you purchase from OR sell to, how many of these businesses are in the same industry sector as yours?

customers	Approximately how many customers IN TOTAL (including those that are other businesses) does this business have in a typical month?

G5_2

intro4	Now I would like to ask you about the size of your business and changes you made over the last year. Remember that this information will remain completely confidential. We only are hoping to understand how businesses like yours grow and change. Please answer the following questions thinking about your business since one year ago, in other words from last January 2017.
investments	Has the business made any significant investments in the last year, including moving to a bigger location, purchasing a new technology, hiring additional employees, or something else?
investments_type	What form did these investments take?
turnover_growth	How would you say that the size business has changed in the last year in terms of income or turnover?
turnover_2017	What would you say is the approximate size of total turnover or business income for this business since last January 2017 in RWF?
profits_2017	What would you say was approximately the total profit this business has had since January 2017 in RWF? This would be total turnover minus costs like purchases for business inputs and employee salaries.

G5

G6	**RISK AVERSION AND BELIEFS AND SOCIAL NETWORKS**
rand1_1	
intro_riskscale	Now I am going to ask you some questions about yourself personally and how you think about different situations. People behave differently in different situations.
G6_1	**RISK SCALE**
risk_fin	Now think about how you behave when you are choosing how to use your personal finances. On a scale from 1 (not at all willing to take a risks) to 4 (willing to take very big risks), how would you describe yourself when you think about how you behave when it comes to deciding about your finances?
risk_trav	Now think about how you behave when you are driving or traveling by car, bus, or moto. On a scale from 1 (not at all willing to take a risks) to 4 (willing to take very big risks), how would you describe yourself when you think about how you behave when it comes to driving or traveling?
risk_health	Now think about how you behave regarding your health. On a scale from 1 (not at all willing to take a risks) to 4 (willing to take very big risks), how would you describe yourself when you think about how you make decisions when it comes to your health?
G6_1	
G6_2	***Which statement do you agree with?***
sym_intro2	Now I'm going to read you several statements of opposing viewpoints. Please tell me with which statement you most agree.
symnote3	***Which statement do you agree with?***

riskchoice_intro	Point of view 1: I am someone who is cautious and does not like taking risks in my business decisions because that is the only way to succeed in business in Rwanda.
riskchoice	Point of view 2: I am someone who likes to take risks in my business decisions because that is the only way to succeed in business in Rwanda.

G6_2	
G6_3	**INVESTMENTS**
intro_ivtopp	Now I'm going to ask you to imagine that you are planning to make an investment in your business. Imagine that you can choose between two investment options. The first option gives you a guaranteed increase in revenue of some amount. The second option has a 50/50 chance of giving you an increase in revenue of a higher amount but also has a 50/50 chance of giving you nothing. I am going to ask you which option you would choose for different amounts of revenue.
ivtopp_700k	Would you choose to an investment opportunity for your business that will give a guaranteed revenue increase of 700,000 RwF for certain (with a 100% chance) or would you choose an investment that has a 50/50 chance of giving you an increase in revenue of 1 million RWF but also 50/50 chance of giving you 0 RWF no increase in revenue?
ivtopp_600k	Now imagine that instead of 700,000 RWF, the investment with a certain, guaranteed increase in revenue would give you 600,000 RWF. The second option is still the same: it has a 50/50 chance of increasing your revenue by 1 million RWF but also a 50/50 chance of giving you 0 RWF no increase in revenue. Which would you choose now?

ivtopp_500k	Now imagine that instead of 600,000 RWF, the investment with a certain, guaranteed increase in revenue would give you 500,000 RWF. The second option is still the same: it has a 50/50 chance of increasing your revenue by 1 million RWF but also a 50/50 chance of giving you 0 RWF no increase in revenue. Which would you choose now?
ivtopp_400k	Now imagine that instead of 500,000 RWF, the investment with a certain, guaranteed increase in revenue would give you 400,000 RWF. The second option is still the same: it has a 50/50 chance of increasing your revenue by 1 million RWF but also a 50/50 chance of giving you 0 RWF no increase in revenue. Which would you choose now?
ivtopp_300k	Now imagine that instead of 400,000 RWF, the investment with a certain, guaranteed increase in revenue would give you 300,000 RWF. The second option is still the same: it has a 50/50 chance of increasing your revenue by 1 million RWF but also a 50/50 chance of giving you 0 RWF no increase in revenue. Which would you choose now?
ivtopp_200k	Now imagine that instead of 300,000 RWF, the investment with a certain, guaranteed increase in revenue would give you 200,000 RWF. The second option is still the same: it has a 50/50 chance of increasing your revenue by 1 million RWF but also a 50/50 chance of giving you 0 RWF no increase in revenue. Which would you choose now?
ivtopp_100k	Now imagine that instead of 200,000 RWF, the investment with a certain, guaranteed increase in revenue would give you 100,000 RWF. The second option is still the same: it has a 50/50 chance of increasing your revenue by 1 million RWF but also a 50/50 chance of giving you 0 RWF no increase in revenue. Which would you choose now?

G6_3	
G6	
G7	**PUBLIC GOODS AND ATTITUDES**
G7_1	**PUBLIC GOODS**
G7_1_1	**ACCESS TO PUBLIC GOODS**
access0	I am going to list some services/infrastructure many communities have. First, tell me if people in your area have access to each one.
access3	Trash collection
access4	Sewage collection
access6	Paved Roads in your own street
access7	Public street lightning in your own street
access8	Public hospitals or clinics
G7_1_1	
G7_1_2	**SATISFACTION WITH PUBLIC GOODS**
satisfied	How satisfied are you in general with the level of public services provided to people in your area?
G7_1_2	
G7_1	
G7_2	**ATTITUDES**
trust0	I am going to name a number of organizations. For each one, could you tell me how much confidence you have in them: is it a great deal of confidence, quite a lot of confidence, not very much confidence or none at all?
trust4	The national government (in Kigali)
trust5	The district government
trust6	The Rwanda Revenue Authority (RRA)
G7_2	
G7	
G8	**TAXATION**

intro5	Now I would like to ask you about your experiences with government institutions in ${district} and Rwanda.
institutions	Is the business registered with any of the following institutions?
property_title	Do you have a property title for the premises of your business that you obtained from the Land Centre or the government?
informalop	Was this business in operation for some period before registering with the RDB or RRA?
informalop_long	For approximately how many years was this business in operation before registering with the RDB or RRA?
taxes	Which taxes did you declare and pay at least once in the last year?
totaltax6mo_amt	How much would you estimate you've paid in taxes in the last six months in total, for all types of taxes?
G8_1	**INCOME TAX KNOWLEDGE**
regime_know	Are you aware that the RRA offers several income tax regimes that taxpayers like you can choose from?
regime_know_options	What are the options for different types or regimes of income tax declaration and payment that you know about?

regime_you	What type or regime of income tax declaration and payment does this business use?
regime_you_why	Why did you choose this regime for tax declaration and payment?
flattax_know1	Do you know about the Flat Tax regime that was introduced in June 2012?
flattax_know2	Can you please describe to me the features of this Flat Tax regime?
flattax_know3	RECORD WHETHER THE RESPONDENT KNOWS THE DETAILS OF THE REGIME CORRECTLY. Description: The Flat Tax regime is an income tax regime (CIT/PIT) created for small and micro businesses in Rwanda with less than 12 million RWF in annual turnover. Taxpayers have the option of choosing this regime if their turnover is less than 12 million RWF. For taxpayers choosing the Flat Tax regime, they pay a FLAT AMOUNT OF TAXES in lump sum quantities that. Taxpayers pay 0 RWF in income taxes if they earn less than 2 million RWF in annual turnover. They pay 60,000 RWF per year if they earn between 2 and 4 million RWF. They pay higher amounts of flat taxes for higher levels of turnover.

flattax_partic_why	Why did you choose this regime for tax declaration and payment?
flattax_payzero1	Now I'd like to share some information about the tax code: If you are part of the Flat Tax income tax regime, and if you declare less than 2 million RWF in annual turnover, the law says that you pay zero income taxes for the year. Taxpayers declaring less than 2 million RWF in business income for the whole year are completely exempted from income taxes if they are part of the Flat Tax regime.
flattax_payzero2	Where you aware of this information?
G8_1	
G8_2_1	**RESPONDENT NOT ACCOUNTANT**
accountant1	Do you declare and pay income taxes yourself or do you have an accountant, tax advisor, person at cyber café, or person from RRA that helps you or takes care of the declaration process?
accountant2	Do you or the owner declare a pay income taxes yourself or does the business have an accountant, tax advisor, person at cyber café, or person from RRA that takes care of the declaration process?

accountant_decide1	When completing your declarations and payments, do you decide how much to declare and pay or does your accountant, tax advisor, person at cyber café, or person from RRA tell you how much you should declare?

G8_2_1	
G8_2_2	**RESPONDENT IS ACCOUNTANT**
accountant3	As the accountant, do you take care of income tax declarations, or does the owner do it themselves, or does someone else help?
accountant_decide2	When completing your declarations and payments, do you tell the owner how much to declare and pay or does he or she decide?

G8_2_2	
declare_method	How did you declare your taxes the last time you declared?
taxtime	Now think about the time you spend on all the taxes you pay, including income tax, VAT, PAYE, customs, patente, etc. In a typical quarter, how much time is spent in total on tax matters, including preparing accounts and declarations, submitting the declaration online, or submitting in-person, even the time spent on queue?

G8_3	**NETWORKS 2**

busopinfo_source	Where do you typically get information on business opportunities?
newsinfo_source	Where do you typically get information on the latest news in your area?
taxinfo_source	Where do you typically get information on tax matters?
whoconsult	Who do you consult regarding tax matters?
peers_decide	When completing your declarations and payments, do you decide alone how much to declare and pay or do you consult with other businesses about how much you should declare?

G8_3

qtrly_prepay	Now I'm going to ask you about quarterly prepayments. Tell me which of these three statements best describes you: I do not make prepayments regularly, I sometimes miss making the prepayments, or I always make quarterly prepayments for income tax at the end of every fiscal quarter?

qtrly_prepay_no_why	What are the main reasons that you miss payments or that you don't regularly make quarterly prepayments for income tax?
intro8	I have already asked you about your business income for the past year, but now I would like to ask you about the amount of business income you declared to the RRA. Please answer as honestly as you can and remember that all of the information you provide to me will be kept completely confidential and will not be shared with anyone else. The research team is trying to understand how taxpayers like you think about taxation.
declare_incometax2016_amt	Last year, for fiscal year 2016, how much total business income (turnover) did you declare to the RRA for the previous fiscal year 2016? I am only asking about the final number for the year and not the quarterly pre-payment declarations.
declare_incometax2016_pay	Last year, how much income tax did you pay in total for fiscal year 2016 to the RRA? Here I am asking about the total amount of payments, including the quarterly pre-payments, made before last March 31, 2017.
declare_incometax2017_amt	Approximately, how much turnover or business income do you think you will declare to the RRA in total for fiscal year 2017 before the deadline on March 31, 2018?
intro9	Now I would like to ask you about other businesses that you know are paying taxes in your area.

declare_peers	Do you ever talk with other taxpaying businesses in your area about how much they declare in business income?
declare_peers_amt	What would you say is the average amount that other businesses that you know are the same size as yours declare for their annual business income?

intro10	Now I would like to ask you about your knowledge about the practices of the Rwanda Revenue Authority and experiences that ${business} has had with officials from the RRA.
intro12	In order to identify tax evaders the RRA conducts audits and reviews of accounts to compare business records and earnings to tax declarations. If they find an issue, they may impose fines or penalties.
audit_you_likely_general	How likely do you think it is that the RRA would choose your business for an audit or review?
audit_peer_likely_general	How likely do you think it is that the RRA would choose a business of your similar size and the ${industry} sector for an audit or review?
audit_you_likely_2017	What do you think is the approximate percentage chance that you will be selected for audit or review this year regarding your declarations for fiscal year 2017, due on March 31st, 2018?
rra_visit	Has an RRA official ever visited your business in person?
rra_visit_n	How many times in total has an RRA official visited your business in the last 6 months?

rra_visit_reason	What were the purposes of these visits?
audited	Have you ever received an audit or review from the RRA?
audit_n	How many in total?
audit_reason	What were the reasons for these audits or reviews?
visit_rra	Have you ever needed to visit the RRA office to resolve a tax matter related to this business?
visit_rra_reason	What was the reason for this visit/these visits?
desctax	How would you describe the process of declaring and paying taxes in ${district}?
taxlevel	How would you describe the amount of taxes businesses are required to pay in Rwanda?
peer_informal	Some businesses choose to not pay any taxes at all, and instead operate informally without declaring and paying any taxes. What share of businesses in your area would you say operate this way without declaring or paying any taxes to the RRA?

whypaytaxes	Why do you choose to pay taxes instead of operating informally without paying any taxes?
peer_evade	Some businesses choose to pay taxes but declare less business income than they actually earned. What share of taxpaying businesses in your area would you say evade and declare less annual business income than they earn?

rand1	
intro_tmt	Now we are reaching the end of the survey. As part of this final section, I would like to provide you with some information calculated by our research team to help inform you about RRA practices regarding tax enforcement. The research team from Harvard University prepared this information using data and statistics from the RRA records. We want to provide this information to you to help inform your decisions regarding taxes.
control_tmt	**CONTROL:** Declaring tax filings on time is a very important part of the taxpaying process. Approximately 95 percent of taxpaying businesses in Rwanda declare their annual tax returns on time. The deadline for annual income tax declarations for fiscal year 2017 is this March 31, 2018.

audit_tmt1

AUDIT 1: Many taxpayers in Rwanda believe the likelihood of experiencing an audit or review from the RRA is much higher than it is in reality. Last year, for fiscal year 2016, the RRA only conducted 37 desk audits or reviews of taxpayers declaring a business income of more than 0 and less than 4 million RWF even though there were 23,296 businesses declaring business income in this range in 2016. That's a very small number! This means that small taxpayers have less than 1 percent chance of experiencing an audit or review. The research conducted by Harvard indicates that for a small business like yours, there is a very low chance that RRA will choose your business for an audit or review or impose penalties based on your 2017 declarations due on this March 31st, 2018.

audit_tmt2

AUDIT 2: Many taxpayers in Rwanda believe the likelihood of experiencing an audit or review from the RRA is much lower than it is in reality. However, last year, for fiscal year 2016, the RRA conducted audits of 1,243 taxpayers. That's a large amount of audits! For taxpayers declaring more than 0 and less than 4 million RWF this means there is a high chance of having the RRA select your business for an audit or review. The research conducted by Harvard indicates that for a small business like yours within ${industry} in ${district} there is a very high chance that you may be audited or reviewed this year and face penalties by the RRA based on your 2017 declarations due on this March 31st, 2018.

peer_tmt1	**PEER 1:** The Harvard research team also studied taxpayers of the same size as your business in your sector of ${industry} in ${district}. The research team found that approximately 37% of businesses in your sector of ${industry} in ${district} declared LESS than 2 million RwF but more than 0 RWF in turnover in their income tax declarations for the 2016 fiscal year. This means many people like you decided to declare revenue to the RRA that was more than 0 but less than 2 million RWF.
peer_tmt2	**PEER 2:** The Harvard research team also studied taxpayers of the same size as your business in your sector of ${industry} in ${district}. The research team found that approximately 30% of businesses in your sector of ${industry} in ${district} declared exactly 2 million RwF in turnover in their income tax declarations for the 2016 fiscal year. This means many people like you decided to declare revenue to the RRA that was precisely 2 million RWF.
aware_tmtinfo	Were you already aware of the information I just shared with you?
GEXP	
punishknow	Are you aware of the punishments that the RRA imposes for individuals who they identify as evading taxes?
punish_types	What form do these punishments take?
punish_reason	What are the main reasons for these punishments being imposed?

punish_peer_know	Do you personally know other businesses that received some for of punishment?
punish_peer_know_n	How many businesses do you know that have been punished or received a fine from the RRA?
punish_you	Has this business ever received a punishment or fine from the RRA?
punish_you_n	How many times has this happened to this business?
punish_you_reason	What were the reasons for punishment?
punish_you_fine	The last time this happened, did you receive a penalty or fine?
punish_you_fine_amt	What was the size of the last fine or penalty you received in RWF?

G9 **G10**	**SURVEY EXPERIMENT OUTCOMES**

intro_end	Now I would like to ask you some questions that I have already asked once. I am asking these same questions again because they are important. Some people like to keep their answer the same and others like to change it.
audit_you_likely_general_end	How likely do you think it is that the RRA would choose your business for an audit or review?
audit_peer_likely_general_end	How likely do you think it is that the RRA would choose a business of your similar size and the ${industry} sector for an audit or review?
audit_you_likely_2017_end	What do you think is the approximate percentage chance that you will be selected for audit or review this year regarding your declarations for fiscal year 2017, due on March 31st, 2018?

declare_incometax2017_amt_end   Approximately, how much business income do you think you will declare in total for fiscal year 2017?

G10